

Modular Advanced Networked Telerobotic Interface System (MANTIS), Phase I

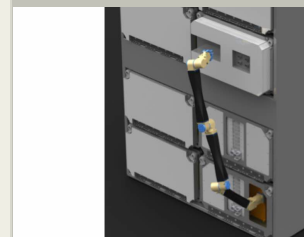
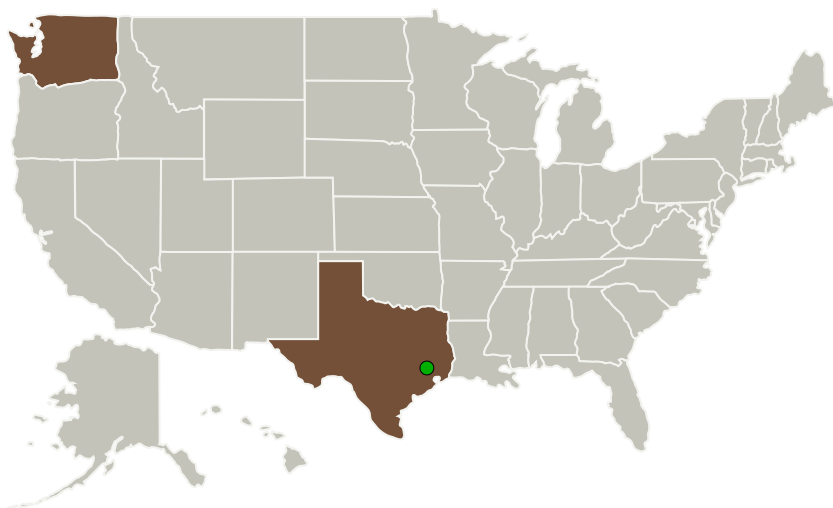
Completed Technology Project (2016 - 2016)



Project Introduction

With the goal to reduce astronaut time required to maintain experiments on the ISS and aid advances in vision processing and robotic arm control technology, TUI proposes to collaborate with NanoRacks to develop a "Modular Advanced Networked Telerobotic Interface System" (MANTIS) that will integrate an existing robotic arm in a NanoLabs payload on the ISS. The MANTIS system will reducing crew member burden for performing NanoLab experiments by enabling automated and/or supervised teleoperated operation of the Plate Reader, MixStix, and other systems in the NanoRacks instruments. The MANTIS development effort will leverage an existing KRAKEN robotic arm, integrate existing hardware and develop open source software to perform experiments on the NanoRacks platform. To aid design and integration in a Model Based Design (MBD) framework this SBIR will also develop an open simulation framework and tools, leveraging the Robot Operating System (ROS) environment. MANTIS will also enable advances in vision processing and arm control algorithms for the ISS by giving researchers an open software framework to develop on MANTIS. The Phase I effort will develop a detailed design for MANTIS. The Phase II effort will build MANTIS and mature it to TRL-6 through integrated testing with the KRAKEN arm and NanoRacks hardware aboard the ISS. NanoRacks has agreed to collaborate with us in these efforts to enable integration of MANTIS with their experiment platform, and will be our transition partner for Phase III commercialization.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Tethers Unlimited Inc	Lead Organization	Industry	
● Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
Texas	Washington

Project Transitions

▶ **June 2016:** Project Start

✓ **December 2016:** Closed out

Closeout Documentation:

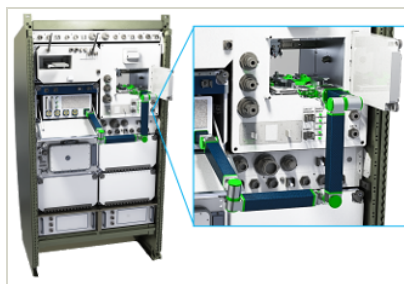
- Final Summary Chart(<https://techport.nasa.gov/file/139699>)

Images



Briefing Chart Image

Modular Advanced Networked Telerobotic Interface System (MANTIS), Phase I
(<https://techport.nasa.gov/image/135082>)



Final Summary Chart Image

Modular Advanced Networked Telerobotic Interface System (MANTIS), Phase I Project Image
(<https://techport.nasa.gov/image/131725>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Tethers Unlimited Inc

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

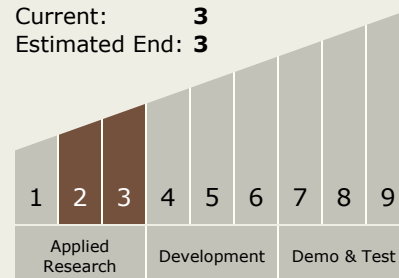
Carlos Torrez

Principal Investigator:

Blaine A Levedahl

Technology Maturity (TRL)

Start: 2
Current: 3
Estimated End: 3



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Technology Areas

Primary:

- TX04 Robotic Systems
 - └ TX04.3 Manipulation
 - └ TX04.3.1 Dexterous Manipulation

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System